United States Department of Agriculture

# McElmo Watershed

## Hydrologic Unit Code 14080202

Natural Resources Conservation Service

Lakewood, Colorado

## Rapid Assessment

RWA 14080202

March 2010

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.)

Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at 202-720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

# Introduction

## Background Information

The Natural Resources Conservation Service (NRCS) is encouraging the development of rapid watershed assessments in order to increase the speed and efficiency generating information to guide conservation implementation, as well as the speed and efficiency of putting it into the hands of local decision makers.

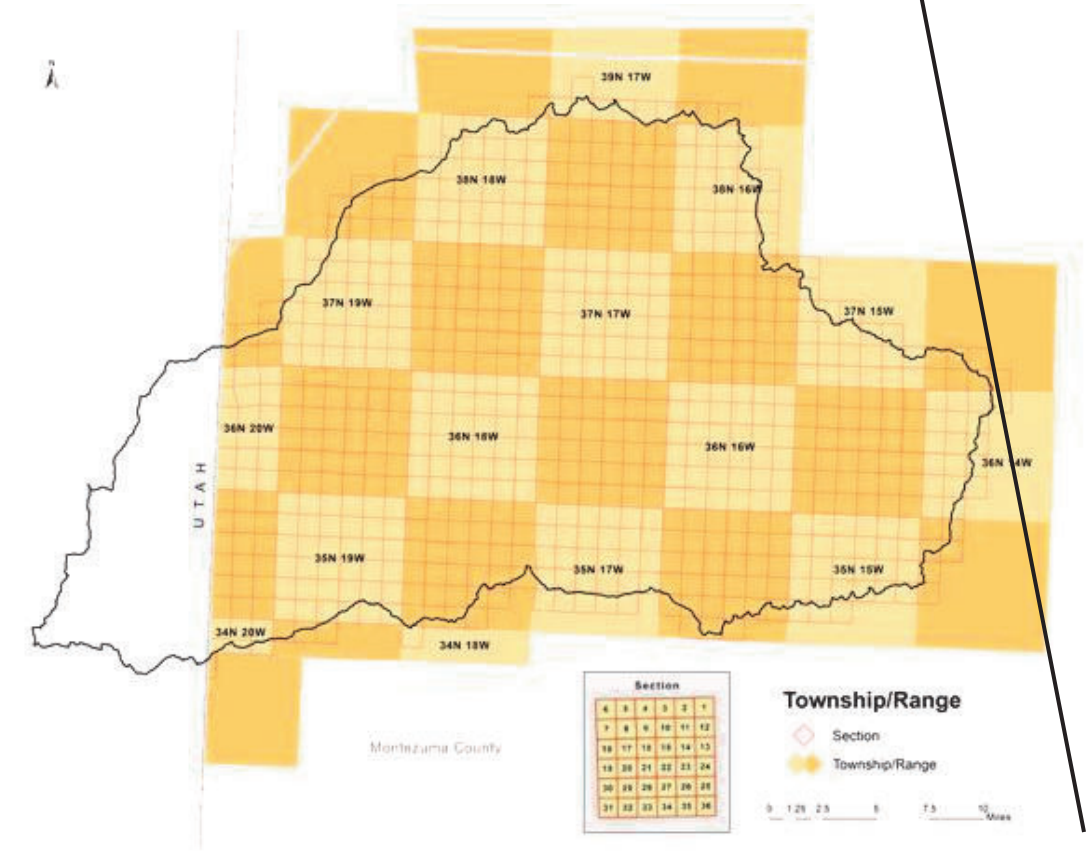
Rapid watershed assessments provide initial estimates of where conservation investments would best address the concerns of landowners, conservation districts, and other community organizations and stakeholders. These assessments help land-owners and local leaders set priorities and determine the best actions to achieve their goals.

## Benefits of these Activities

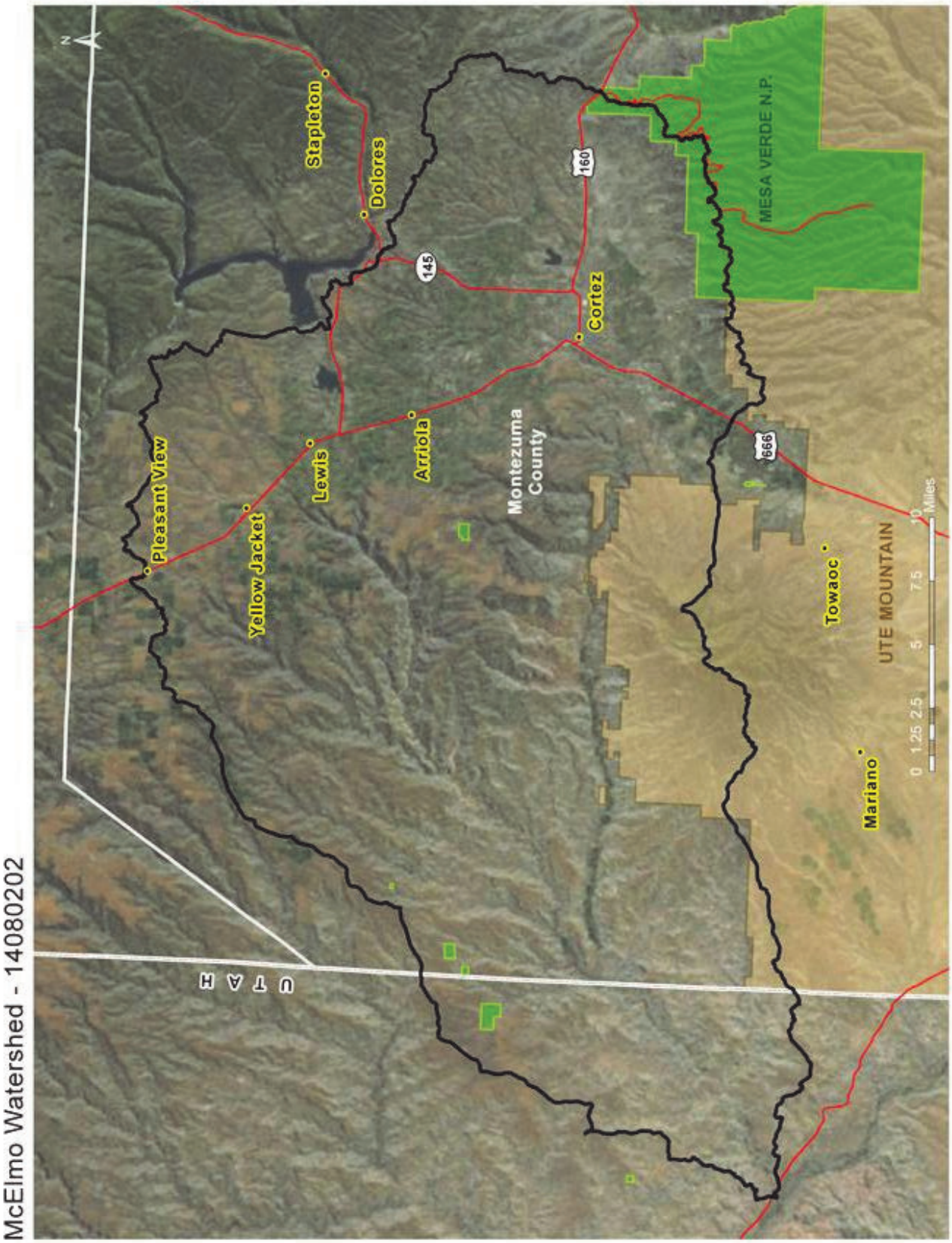
While rapid assessments provide less detail and analysis than full-blown studies and plans, they do provide the benefits of NRCS locally-led planning in less time and at a reduced cost. The benefits include:

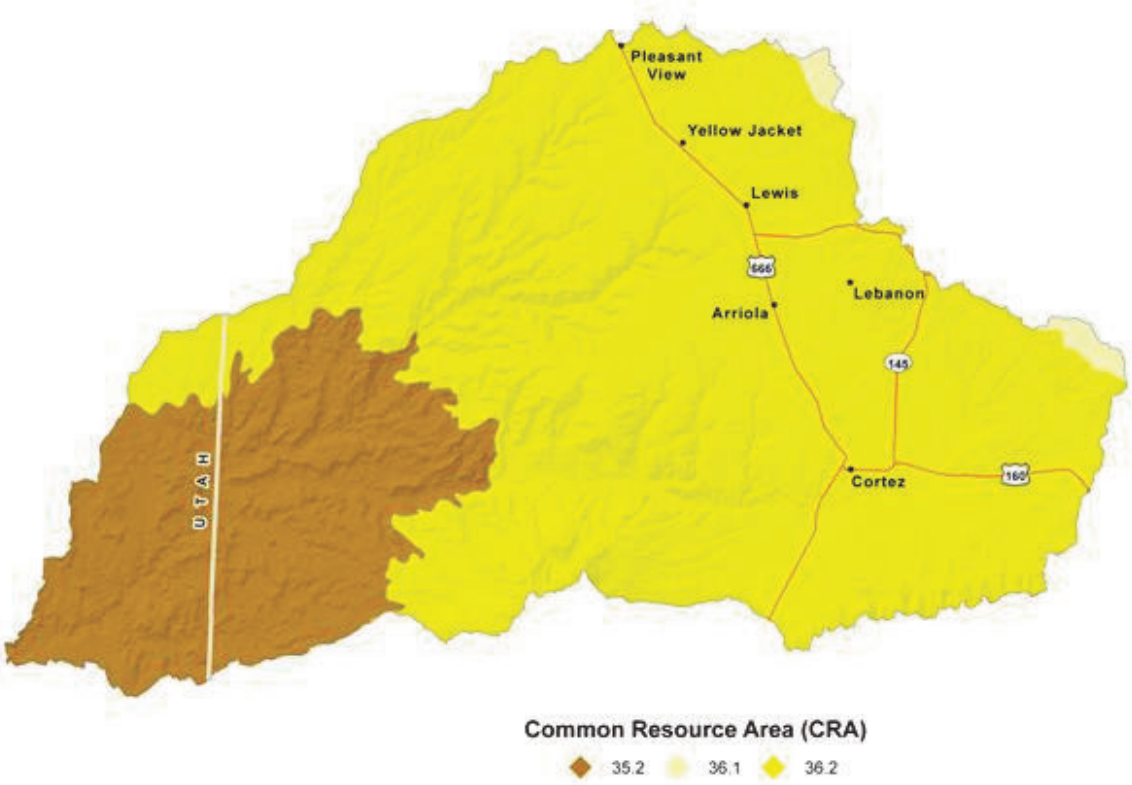
- Quick and inexpensive tools for setting priorities and taking action
- Providing a level of detail that is sufficient for identifying actions that can be taken with no further watershed-level studies or analyses
- Actions to be taken may require further Federal or State permits or ESA or NEPA analysis but these activities are part of standard requirements for use of best management practices (BMPs) and conservation systems
- Identifying where further detailed analyses or watershed studies are needed
- Plans address multiple objectives and concerns of landowners and communities
- Plans are based on established partnerships at the local and state levels
- Plans enable landowners and communities to decide on the best mix of NRCS programs that will meet their goals
- Plans include the full array of conservation program tools (i.e. cost-share practices, easements, technical assistance)

**Rapid Watershed Assessments provide information that helps land-owners and local leaders set conservation priorities.**

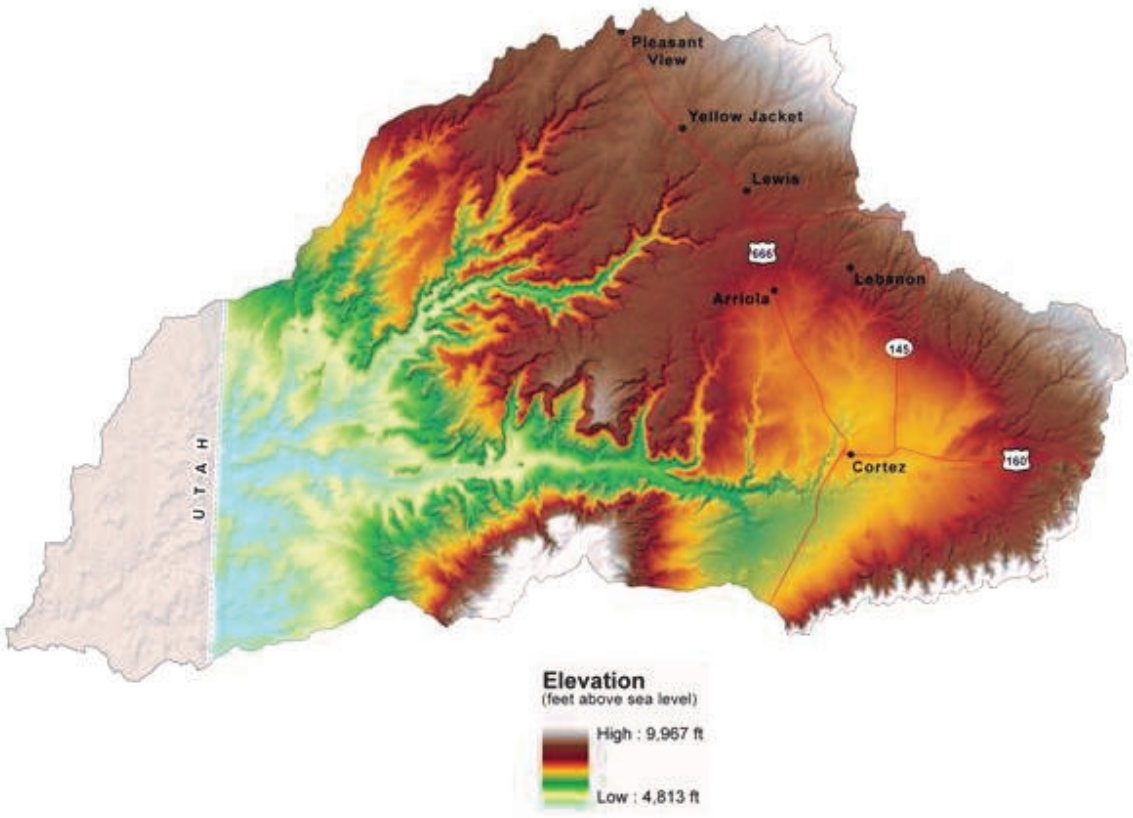



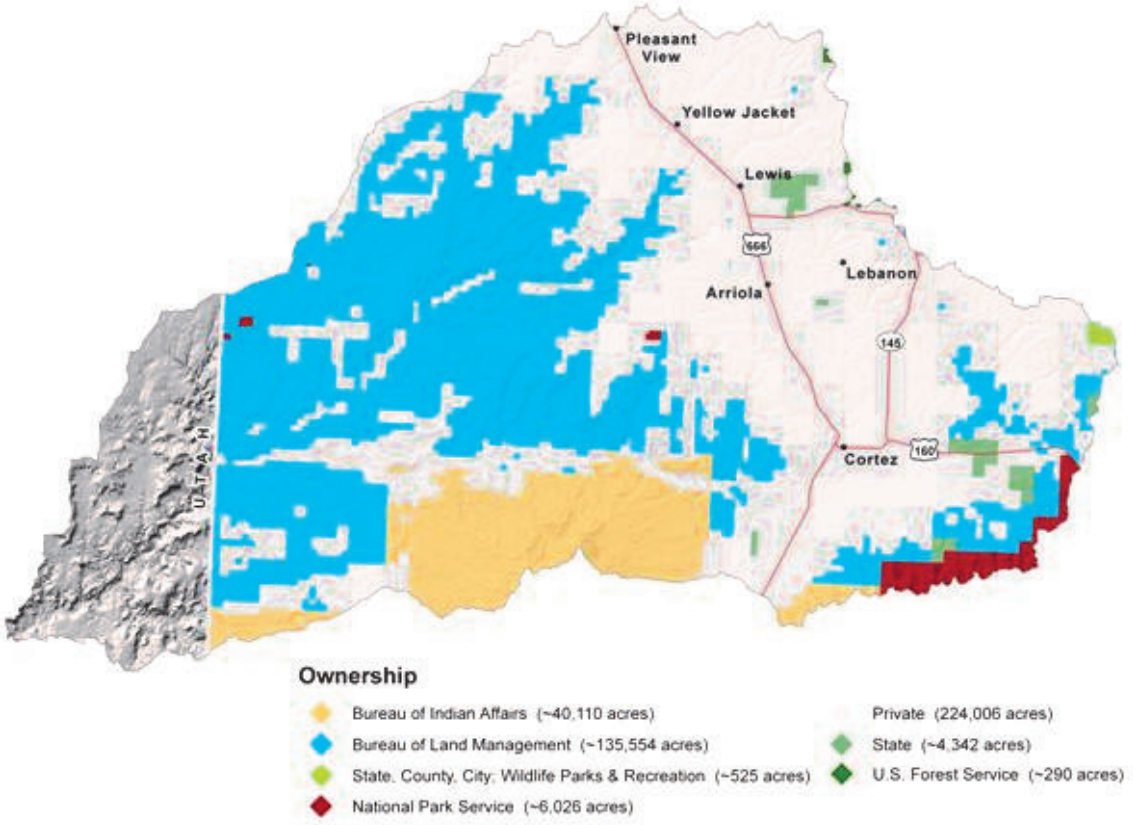

| ***COLORADO County*** | **County Acres** | **County Acres in MCELMO Watershed** | **% of County in the Watershed** | **% of Watershed in the County** |
|---|---|---|---|---|
| Montezuma | 1,306,961 | 410,973 | 31.4% | 89.4% |
| ***UTAH County*** | | | | |
| San Juan | 5,074,979 | 48,773 | 1.0% | 10.6% |
| | | 459,746 | | |

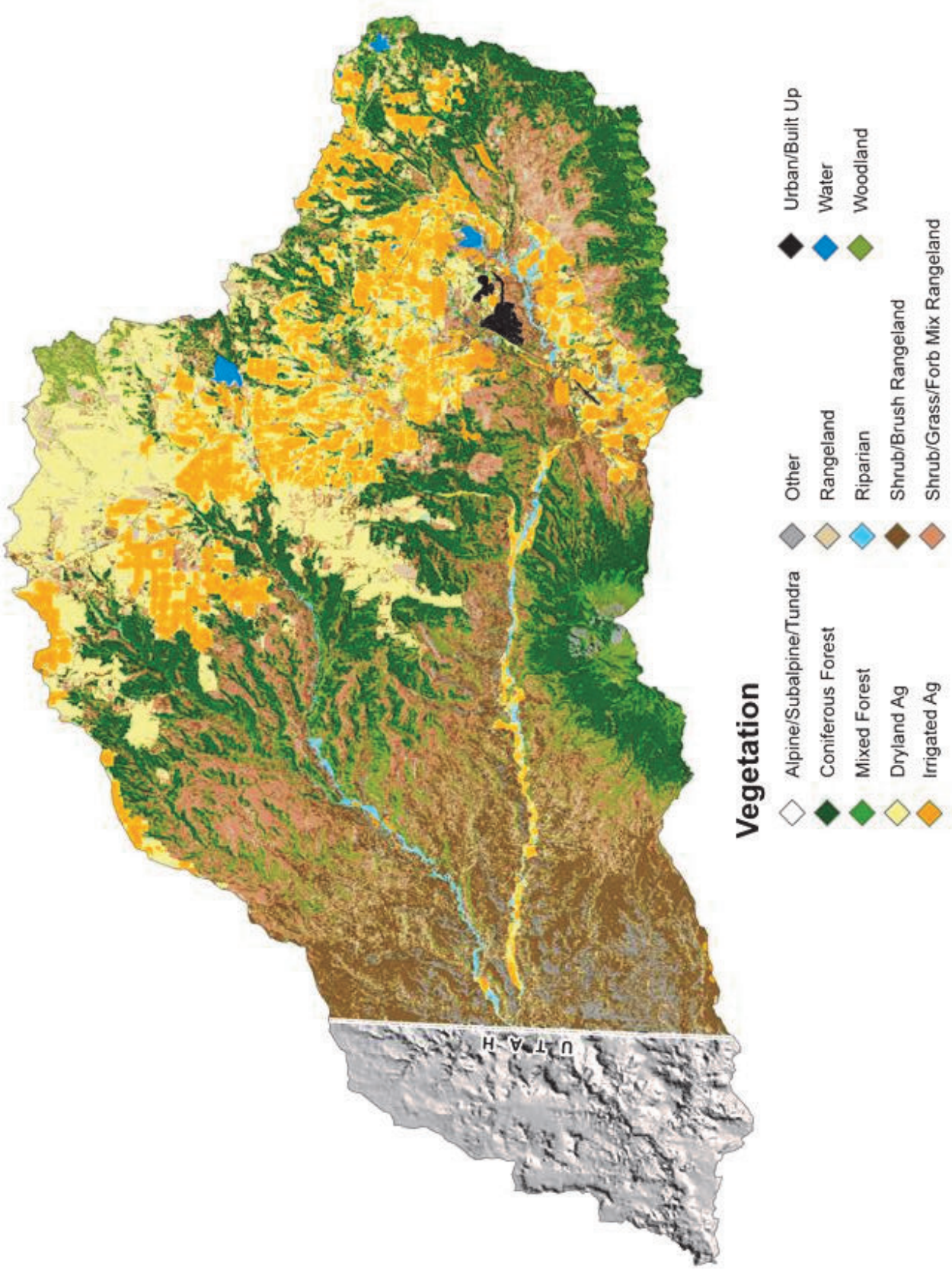

McElmo Watershed - 14080202
UTAH
Stapleton
Dolores
145
160
Cortez
MESA VERDE N.P.
Pleasant View
Yellow Jacket
Lewis
Arriola
Montezuma
County
666
Towaoc
UTE MOUNTAIN
Mariano
0 1.25 2.5 5 7.5 10
Miles




| MLRA | CRA | CRA NAME | CRA DESCRIPTION |
|---|---|---|---|
| 35 | **35.2** | Colorado Plateau Shrub - Grasslands | This unit occurs within the Colorado Plateau Physiographic Province and is characterized by gently dipping sedimentary rocks eroded into plateaus, valleys and deep canyons. Volcanic fields occur in places. Elevations range from 3500 to 5500 feet. Precipitation averages 6 to 10 inches per year. The soil temperature regime is mesic and the soil moisture regime is typic aridic. Vegetation includes shadscale, fourwing saltbush, mormon tea, Indian ricegrass, galleta, and blue and black grama. |
| 36 | **36.1** | Southwestern Plateaus, Mesas, and Foothills - Cool Subhumid Mesas and Foothills | This area encompasses the higher elevation mesas and foothills that represent a transition to the Southern Rocky Mountains. The temperature regime is frigid, and the moisture regime is ustic. The typical vegetation is big sagebrush, Gambel oak, and ponderosa pine. Land use is mainly forest and grazing land. |
| 36 | **36.2** | Southwestern Plateaus, Mesas, and Foothills - Warm Semiarid Mesas and Plateaus | This area encompasses the lower elevation mesas and plateaus. The temperature regime is mesic and the moisture regime is transitional from ustic to aridic. Vegetation is typically twoneedle pinyon, Utah juniper, and big sagebrush. Cropland is a significant land use in parts of this area, particularly on soils formed in thick deposits of eolian material. Precipitation ranges from 10 to about 16 inches. Elevations range from about 6,000 to 7.000 feet. |


Pleasant View
Yellow Jacket
Lewis
666
Lebanon
Arriola
145
160
Cortez
U T A H
Elevation
(feet above sea level)
High : 9,967 ft
Low : 4,813 ft


Pleasant View
Yellow Jacket
Lewis
666
Lebanon
Arriola
145
160
Cortez
U T A H
Ownership
Bureau of Indian Affairs (~40,110 acres)
Bureau of Land Management (~135,554 acres)
State, County, City, Wildlife Parks & Recreation (~525 acres)
National Park Service (~6,026 acres)
Private (224,006 acres)
State (~4,342 acres)
U.S. Forest Service (~290 acres)

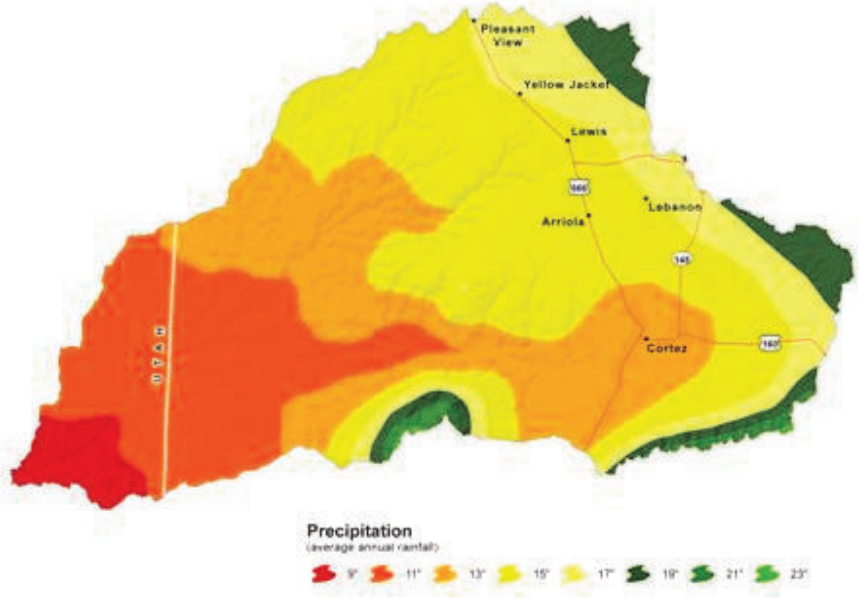

UTAH
Vegetation
Alpine/Subalpine/Tundra
Coniferous Forest
Mixed Forest
Dryland Ag
Irrigated Ag
Other
Rangeland
Riparian
Shrub/Brush Rangeland
Shrub/Grass/Forb Mix Rangeland
Urban/Built Up
Water
Woodland

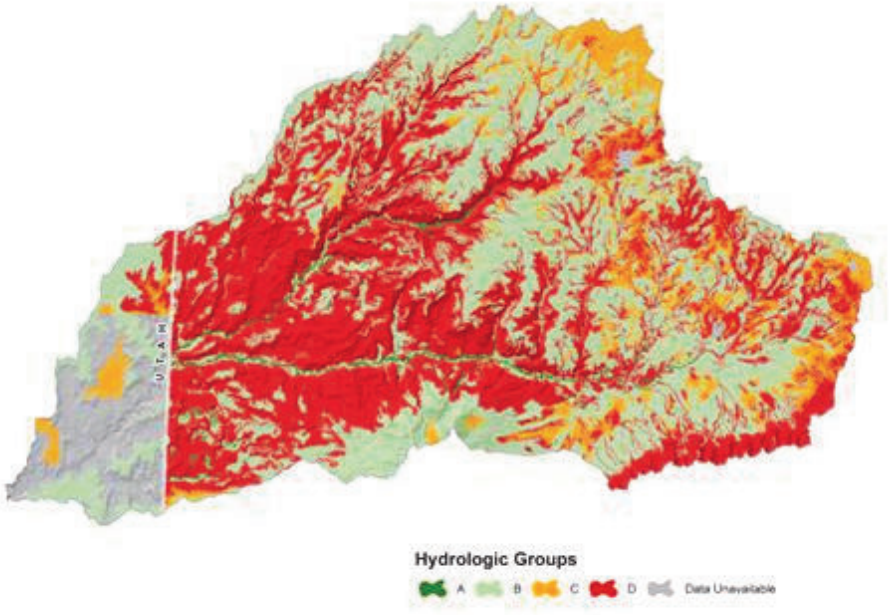
| McELMO WATERSHED Land Use | Total Acreage | Vegetation | Acreage |
|---|---|---|---|
| Cropland | 49,750 | Dryland Ag | 49,750.0 |
| | | Irrigated Ag* | 45,306.0 |
| Rangeland/Grassland | 283,179 | Gambel Oak | 4,710.9 |
| | | Grass/Forb Rangeland | 34,048.0 |
| | | Greasewood | 2,066.7 |
| | | Mesic Mountain Shrub Mix | 2,829.4 |
| | | PJ-Mtn Shrub Mix | 406.8 |
| | | PJ-Sagebrush Mix | 27,646.9 |
| | | Pinon-Juniper | 70,539.5 |
| | | Rabbitbrush/Grass Mix | 51,600.9 |
| | | Sagebrush Community | 32,417.8 |
| | | Sagebrush/Grass Mix | 6,428.8 |
| | | Saltbush Community | 39,829.7 |
| | | Sparse PJ/Shrub/Rock Mix | 10,653.2 |
| | | Upland Willow/Shrub Mix | 0.2 |
| Forest | 9,863 | Aspen | 184.7 |
| | | Douglas Fir | 2,479.9 |
| | | Englemann Spruce/Fir Mix | 656.2 |
| | | P. Pine/Gambel Oak Mix | 5,356.3 |
| | | Ponderosa Pine | 1,183.8 |
| | | Spruce/Fir/Aspen Mix | 2.5 |
| Riparian | 5,767 | Riparian | 5,767.4 |
| Water | 1,183 | Water | 1,183.5 |
| Other | 14,924 | Alpine Meadow | 1.1 |
| | | Barren Land | 494.4 |
| | | Rock | 13,049.5 |
| | | Talus Slopes & Rock Outcrops | 0.3 |
| | | Urban/Built Up | 1,379.0 |
| **Total Watershed Acres** | | | **409,973.2** |

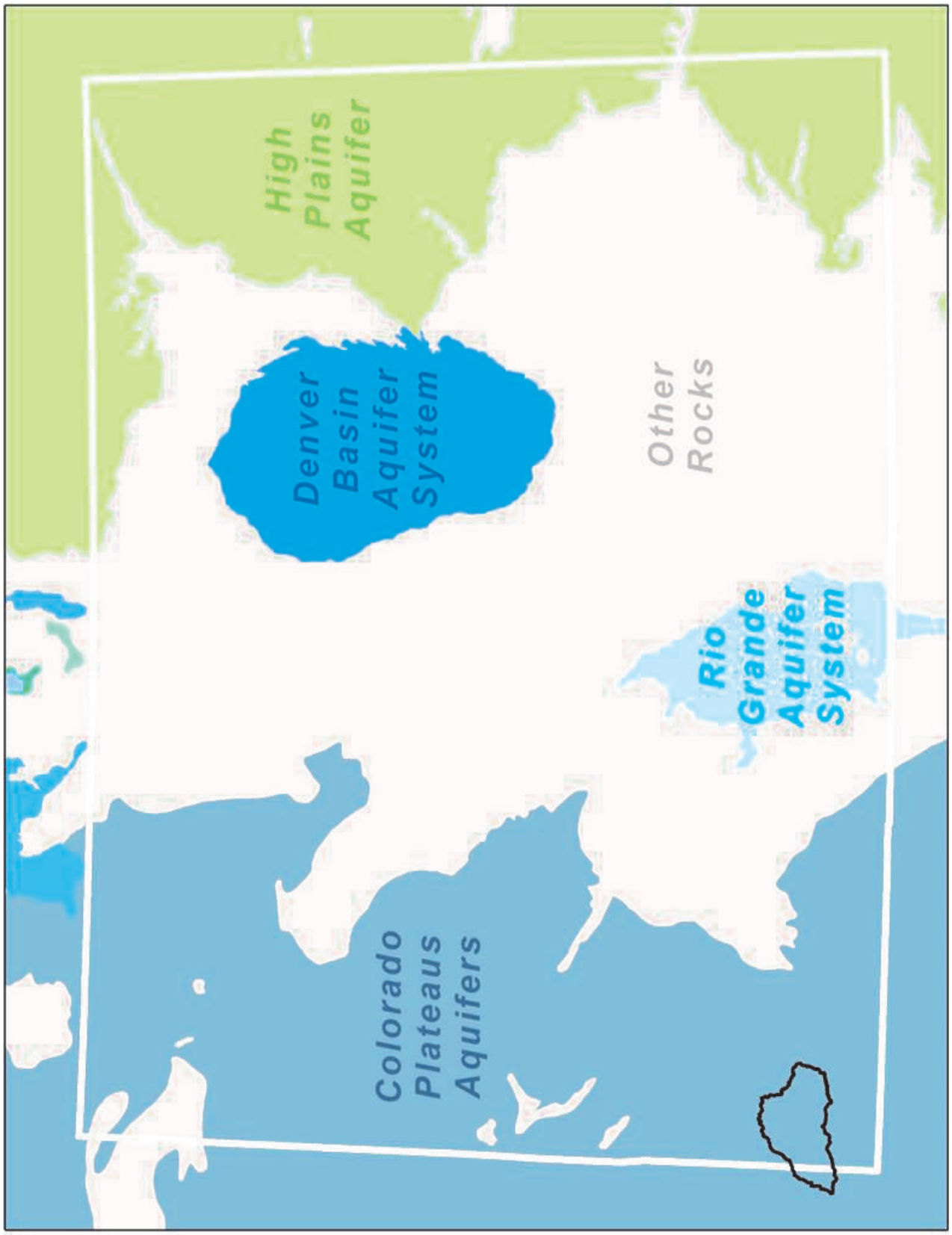
* Colorado Decision Support Systems Data

**Precipitation**

Droughts are regular visitors to the watershed as with the rest of Colorado. Statewide, in the 1900's alone, four prolonged dry spells occurred. There was one in the 1910s. Another, in the '30s, caused the dust-bowl period. The second worst drought on record in the state occurred in the mid-50s. A series of hot, dry summers following a period of scant mountain snowpack created water shortages. The fourth drought hit parts of Colorado in the late 1970s. In this century, the most severe drought since 1723 hit the state in 2002. Prior to the 1700's, researchers looking at tree ring records have found evidence of even more severe droughts, some lasting many years. Rainfall occurs as frontal storms in the spring and early summer and high intensity, convective thunderstorms in late summer. Maximum precipitation is from mid spring through late autumn. Precipitation in winter is usually snow.




High Plains Aquifer
Denver Basin Aquifer System
Other Rocks
Rio Grande Aquifer System
Colorado Plateaus Aquifers

**Class 1** - soils have few limitations that restrict their use.

**Class 2** - soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

**Class 3** - soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

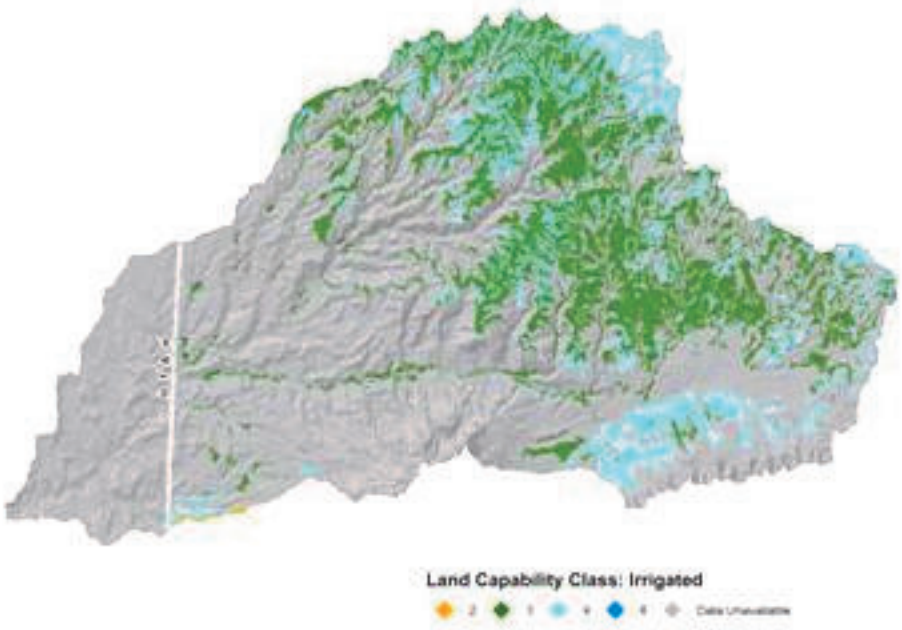
**Class 4** - soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

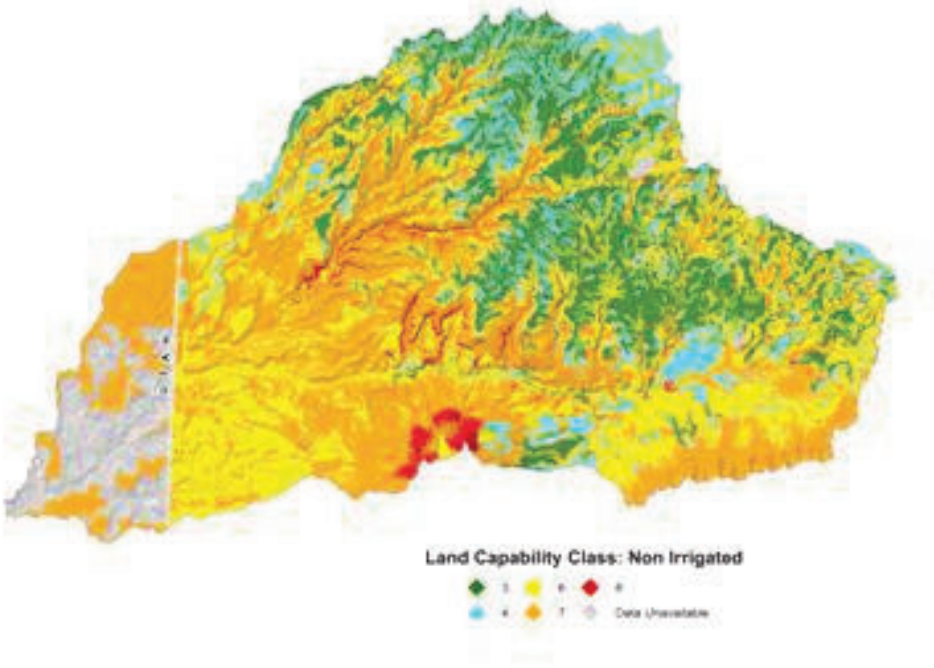
**Class 5** - soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

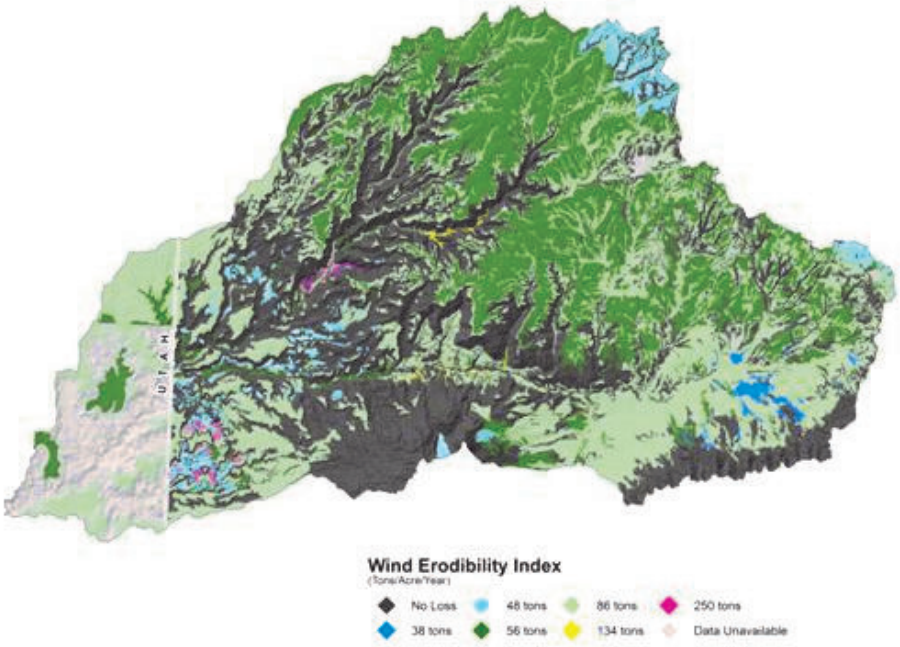
**Class 6** - soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

**Class 7** - soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

**Class 8** - soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or aesthetic purposes.





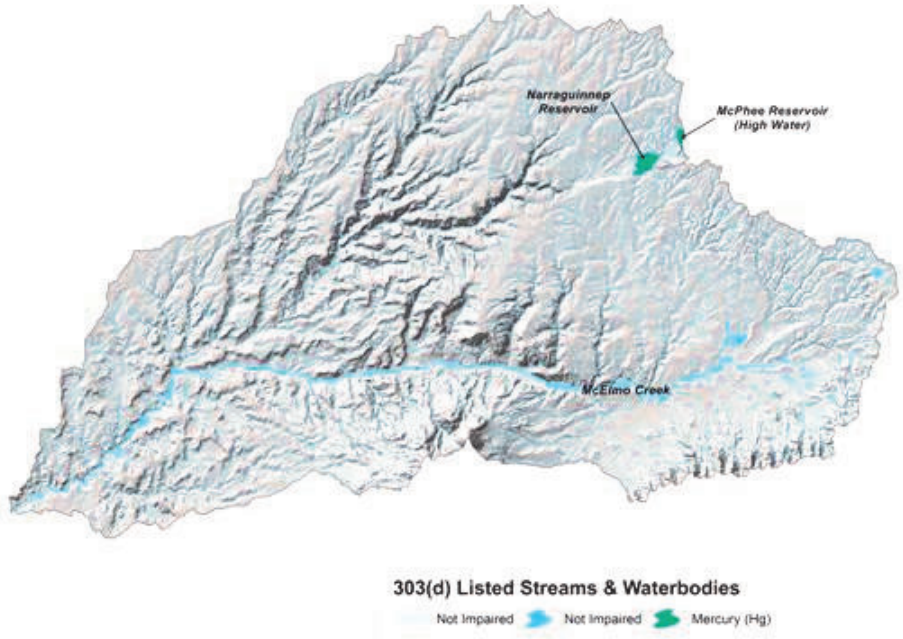

**The Wind Erodibility Index (WEI):** numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion if it is assumed there is no vegetative cover or management.

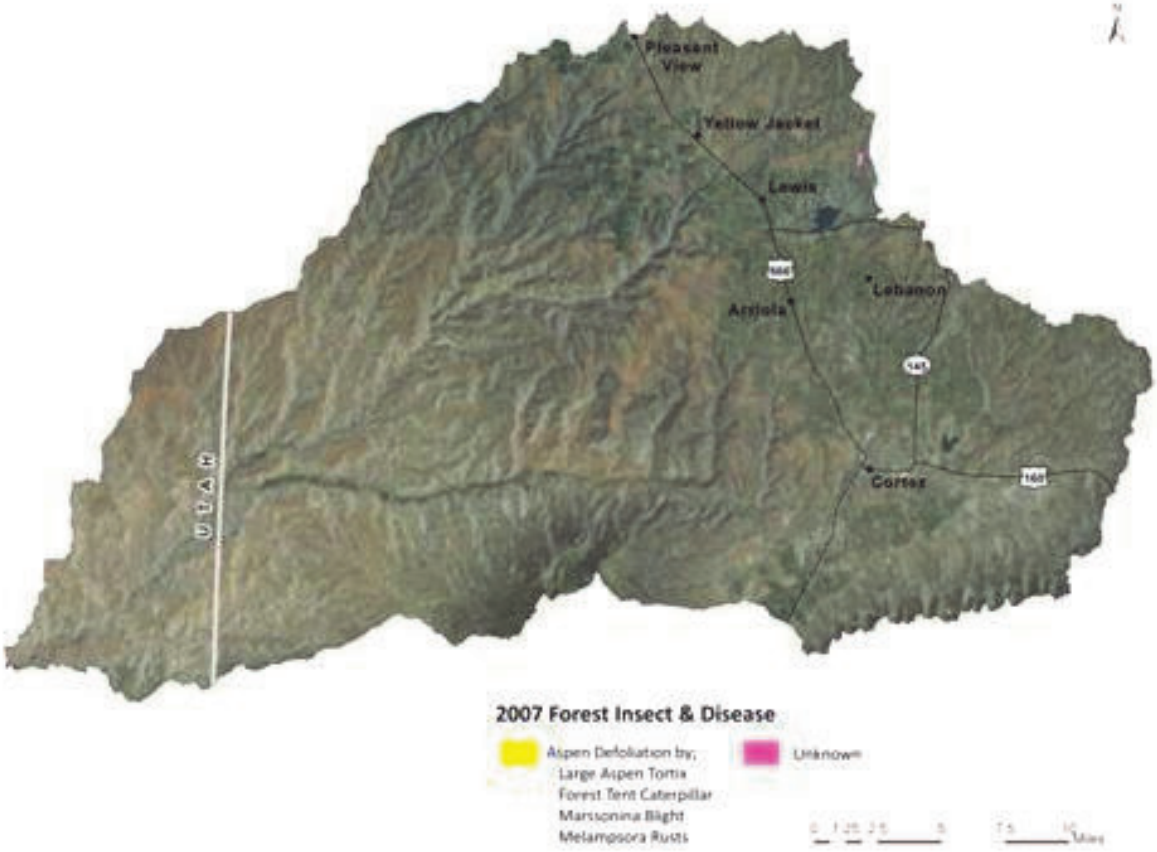
Soils with an erodibility index equal to or greater than 8 are considered highly erodible.

As shown on the Wind Erodibility Index map below, most cropland soils in the McElmo Watershed are considered highly erodible.

**Streams Listed as Impaired**

Section 303(d) of the Clean Water Act requires states to identify and list all water bodies where state water quality standards are not being met. Thereafter, TMDLs comprising of quantitative objectives and strategies have been or will be developed for these impaired waters within the watershed in order to achieve their water quality standards.





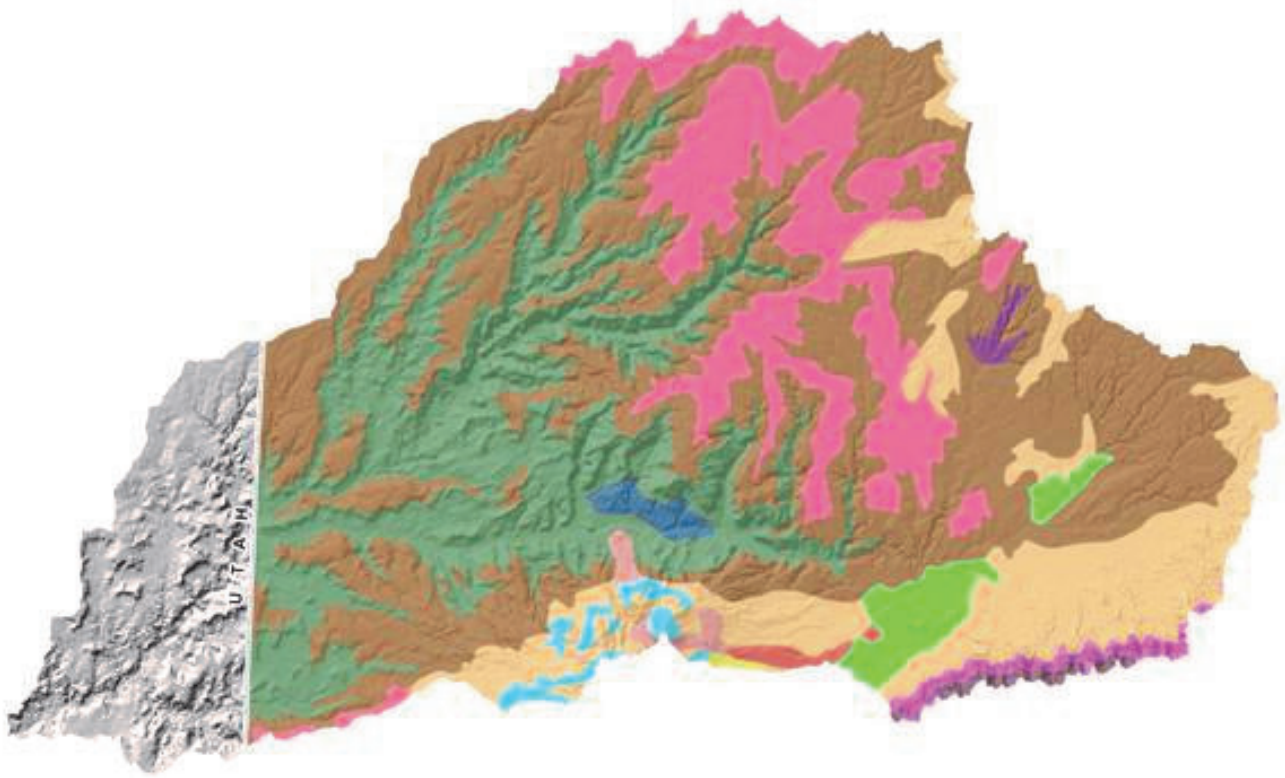

**2007 Forest Insect & Disease**

Aspen Defoliation by;
Large Aspen Tortix
Forest Tent Caterpillar
Marssonina Blight
Melampsora Rusts

Unknown


**2008 Forest Insect & Disease**

Unknown



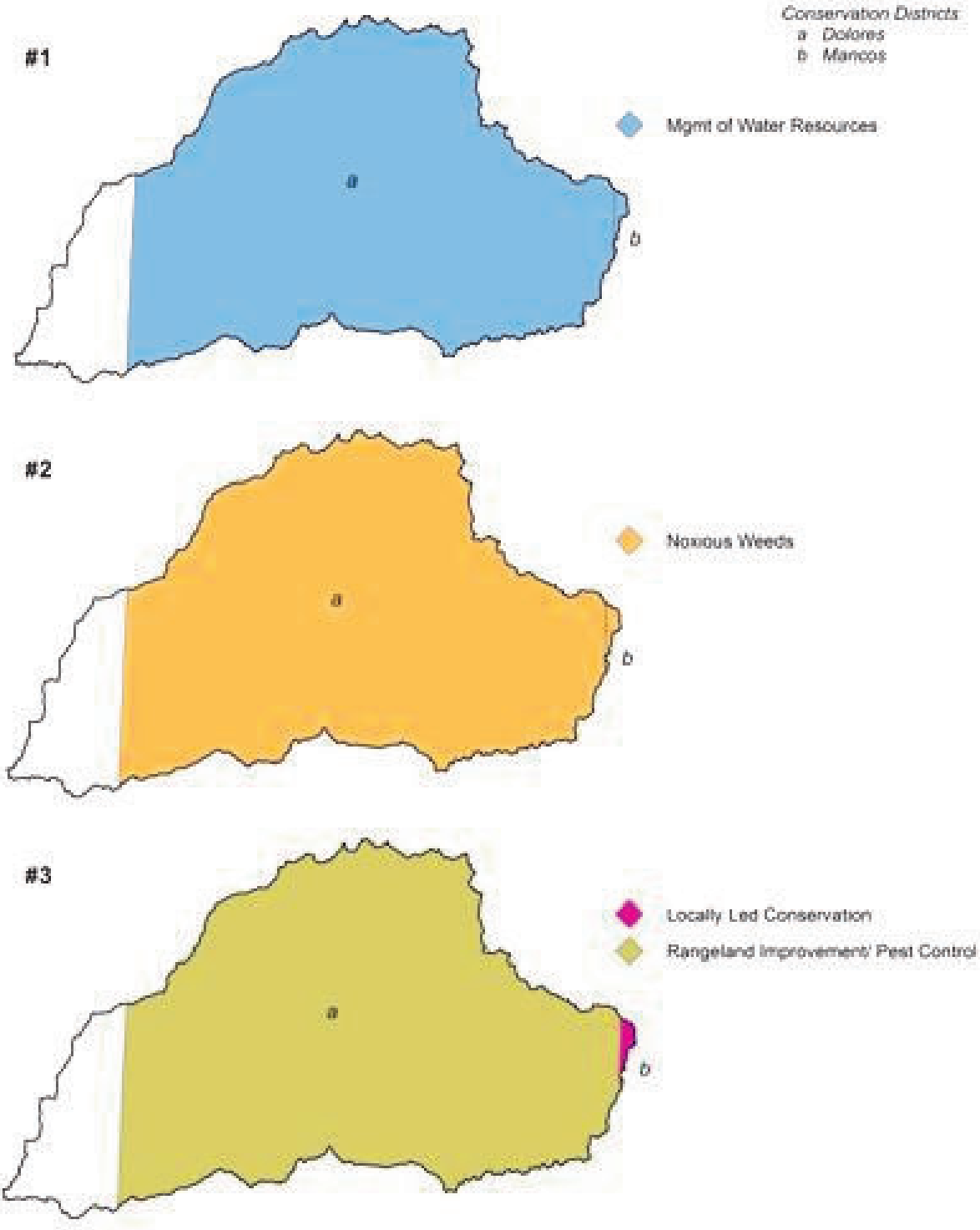

## Geology

- CLIFF HOUSE SANDSTONE
- DAKOTA SANDSTONE AND BURRO CANYON FORMATION
- EOLIAN DEPOSITS
- GLEN CANYON GROUP AND CHINLE FORMATION
- Juana Lopez Member
- LANDSLIDE DEPOSITS
- LARAMIDE INTRUSIVE ROCKS (AGE 40-72? M.Y.)
- MANCOS SHALE
- MENEFEE FORMATION (SANDSTONE, SHALE, AND COAL) AND POINT LOOKOUT SANDSTONE
- MODERN ALLUVIUM
- MORRISON FORMATION
- MORRISON FORMATION, SUMMERVILLE FORMATION (SHALE AND SILTSTONE), AND ENTRADA SANDSTONE
- OLDER GRAVELS AND ALLUVIUMS (PRE-BULL LAKE AGE)
- WATER

| Social Data | Montezuma |
|---|---|
| **Demographics (US Census, American Factfinder)** | |
| Total population | 23,830 |
| Male | 11,716 |
| Female | 12,114 |
| Median age (years) | 38 |
| White | 19,474 |
| Black or African American | 33 |
| American Indian and Alaska Native | 2676 |
| Asian | 48 |
| Native Hawaiian and Other Pacific Islander | 15 |
| Some other race | 1015 |
| Hispanic or Latino (of any race) | 2263 |
| **Economic Characteristics (US Census, American Factfinder)** | |
| In labor force (population 16 years and over) | 11,434 |
| Median household income (dollars) | 32,083 |
| Median family income (dollars) | 38,071 |
| Per capita income (dollars) | 17,003 |
| Families below poverty level | 859 |
| Individuals below poverty level | 3836 |
| X means that value is not applicale or not availiable | |
| **County Agricultural Characteristics (Colorado Agricultural Census, county data tables)** | |
| Farms (number) | 829 |
| Land in farms/ranches (acres) | 818,677 |
| Average size farm/ranch (acres) | 988 |
| Median size farm (acres) | 105 |
| Average age of farmer or rancher | 56 |
| Net cash return from ag sales ($1,000) | -2,661 |
| Cattle and calves (number) | 15,000 |

## Identified Long Range Resource Concerns

**Top Three Concerns within Conservation Districts**



## Selected Conservation Application Data

| | FY 2004 | FY 2005 | FY 2006 | FY 2007 | FY 2008 | Total |
|---|---|---|---|---|---|---|
| Practices | | | | | | |
| Range Planting | 565 | 88 | 172 | 181 | 563 | 1,569 |
| Irrigation Water Management | 236 | 108 | 120 | 892 | 718 | 2,074 |

## Conservation Systems to Address Major Resource Concerns

| **Primary Resource Concern:** | **Rangeland Health** | | | |
|---|---|---|---|---|
| **Conservation System Description:** | Prescribed Grazing—planned management that provides adequate recovery opportunity between grazing events and proper stocking of animals. | | | **Based on Conservation System Guide Code:** CO 35.2-GR-01-R-Grazing |
| **Practices** | **Unit** | **Quantity** | **Cost/Unit ($)** | **Estimated Cost ($)** |
| Prescribed Grazing | | | | |
| Fence (382) | Ft. | 21,120 | 0.6 | 12,672 |
| Pest Management (595) | Ac. | 300 | 4,500 | 4,500 |
| Pipeline (516) | Ft. | 15,000 | 2.40 | 36,000 |
| Upland Wildlife Habitat Management (645) | Ac. | 300 | na | 0 |
| Watering Facility (614) | No. | 2 | 410 | 820 |
| Range Planting | Ac. | 50 | 11.85 | 850 |
| Costs to apply prescribed grazing per median sized ranch of 1,500 acres | No. | 22 | 54,842 | |
| **Subtotal: Rangeland costs** | | | | **$1,206,524** |

| Primary Resource Concern: | Water Quality—Salinity | | | |
|---|---|---|---|---|
| **Conservation System Description:** | Earthen ditch irrigation system converted to Sideroll Sprinkler or Gravity System with Structure for Water Control, Underground Pipeline, IWM. | | | **Reference Conservation System Guide Code:** CO 36.2.-HY-Sideroll-R-1 |
| **Practices** | **Unit** | **Quantity** | **Cost/Unit ($)** | **Estimated Cost ($)** |
| Irrigation Water Management (449) may include: | Ac | 32,000 | 2,900 | 92,800,000 |
| Gated Pipe | | | | |
| Irrigation System, Sprinkler (442) | | | | |
| Nutrient Management (590) | | | | |
| Pest Management (595) | | | | |
| | | | | |
| | | | | **Subtotal Costs Irrigated Crops $92,800,000** |

## General Effects, Impacts, and Costs of Application of Conservation Systems

| Landuse | Resource | Measurable Effects | Non-measurable Effects | Costs ($) |
|---|---|---|---|---|
| Range | Plants, soil | | Improved plant condition, productivity, health and vigor. Grazing animals have adequate feed, forage, and shelter. | **1,206,524** |
| Irrigated Crop | Water, soil | | Nutrients and organics are stored, handled, disposed of, and managed so that surface water uses are not adversely affected. | **92,800,000** |
| | | | Estimated Total Costs to Address Major Resource Concerns: | **$94,006,524** |

## FOOTNOTES/ BIBLIOGRAPHY

**303(d)** listed streams within the Watershed were created using data from Colorado Department of Public Health & Environments' Water Quality & Control Commission. Impaired streams are current as of April 30, 2006. For a list of all Colorado impaired streams, locations and priority ratings, visit http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf.

Stream data from National Hydrologic Dataset http://nhd.usgs.gov

**Threatened and Endangered Species** information was gathered using data from the Colorado Division of Wildlife (CDOW) Natural Diversity Information Source (NDIS). NDIS GIS data may be downloaded at http://ndis.nrel.colostate.edu. **Resource Concerns** were identified using the Colorado Association of Conservation Districts' (CACD) long range (10 year) plans from the period of 1996-2000. Only the top three environmental resource concerns for each district were used. For more information on Colorado's Conservation Districts, visit http://www.cacd.us.

Maps were generated using Soil Survey Geographic Database (SSURGO) tabular and spatial data. SSURGO data was downloaded for the following Colorado surveys:

Animas-Dolores Area (672) Published 01/08/2007

San Miguel Area (CO675) Published 01/10/2007

Uncompahgre Area (CO676) Published 01/10/2007

Ridgeway Area (CO677) Published 07/10/2006

Paonia Area (CO679) Published 01/10/2007

**Vegetation** data was generated using the Colorado Division of Wildlife's "Colorado Vegetation Classification Project" (CVCP) data. Completed in 2003, the CVCP is a landscape level vegetation dataset created using Landsat TM imagery and then formatted for GIS use. The species identified are an overview of the most common species associated in each cover type, in order of greatest occurrence. For more information on the Colorado Vegetation Classification Project, visit http://ndis.nrel.colostate.edu/coveg.

All border state (if applicable) vegetation data courtesy of the National Land Cover Dataset (NLCD). For more information visit http://www.mrlc.gov/mrlc2k_nlcd.asp

**Common Resource Area** (CRA), a subdivision of the Major Land Resource Area (MLRA), is a geographical area where resource concerns, problems, or treatment needs are similar. Geographic boundaries of a CRA are determined by landscape conditions, soil, climate, human considerations and other natural resource information. For more information on Common Resource Areas visit http://soils.usda.gov/survey/geography/cra.html.

**Average Annual Precipitation** data was developed through a partnership between the Natural Resources Conservation Service's (NRCS) National Water and Climate Center (NWCC), the National Cartography and Geospatial Center (NCGC), and the PRISM (the Parameter-elevation Regressions on Independent Slopes Model) group at Oregon State University (OSU), developers of PRISM. Mean annual precipitation maps were developed calculating averages of rainfall for the period of 1961-1990. For more information on PRISM data visit http://www.ncgc.nrcs.usda.gov/products/datasets/climate/docs/fact-sheet.html or for more information about technical aspects of PRISM, visit the PRISM website at http://www.ocs.orst.edu/prism.

**Land Ownership** (status,07/22/2006 dataset) data was obtained from the Bureau of Land Management, Colorado State Office. For more information, visit http://www.blm.gov/co/st/en/BLM_Programs/geographical_sciences/gis.html

**Relief & Elevation** maps were created using the National Elevation Dataset (NED), 30m Digital Elevation Model (DEM) raster product assembled by the U.S. Geological Survey (USGS). A hillshade grid was created from the 30m DEM to create a 3D effect. For more information about the NED visit http://ned.usgs.gov. The data was downloaded from the NRCS Geospatial Data Gateway at http://datagateway.nrcs.usda.gov.